

**What is claimed is:**

1. A sheet coil, comprising:  
an electrically insulative sheet substrate; and  
5 at least one coil formed as a wiring trace of an electrically conductive material in a winding direction on the sheet substrate, the coil being divided by at least one slit extending in the winding direction to form multiple partial coils of the coil.
- 10 2. The sheet coil of claim 1, wherein the slit divides the coil into multiple separate partial coils arranged parallel to each other on the sheet substrate, the partial coils of the coil being configured to be energized with AC current having the same phase.
- 15 3. The sheet coil of claim 2, wherein:  
the said wiring trace is formed in a fixed-cycle waveform; and  
the sheet substrate with wiring trace is pleat-folded to form the sheet coil, the pleat-folds being regularly spaced from one another relative to the fixed-cycle waveform.
- 20 4. The sheet coil of claim 2, further comprising:  
a plurality of individual coils formed on the sheet substrate, the coils forming at least one group; and  
a connector unit formed on the sheet substrate for serially connecting  
25 together the coils of the group and for serially connecting selected partial coils in the group together.
5. The sheet coil of claim 4, wherein:  
a count  $N_b$  of the partial coils is equal to a divisor of a number of coils  $N_c$   
30 facing a stator; and

the connector unit serially connects the selected partial coils together at sites that are shifted by one from one partial coil to the next.

5 6. The sheet coil of claim 4, wherein the connector unit is made of an electrically insulative sheet substrate with connective wiring traces formed thereon of an electrically conductive material, the connector unit being contiguous with the sheet coil.

10 7. The sheet coil of claim 2, further comprising:  
a plurality of individual coils formed on the sheet substrate, the coils forming at least one group; and  
a connector unit formed on the sheet substrate for serially connecting together the coils of the group and for serially connecting selected partial coils in the group, the partial coils being selected individually from each of the coils of the  
15 group.

20 8. The sheet coil of claim 7, wherein the connector unit serially connects the partial coils together using at least two partial coils located in symmetrical positions within each coil.

25 9. A sheet coil, comprising:  
an electrically insulative substrate configured as a sheet extending in an longitudinal winding direction;  
multiple coils each formed as a respective wiring trace on the insulative substrate and extending in the winding direction;  
each coil comprising at least one slit extending in the winding direction so as to form multiple respective partial coils of the coil; and  
in each coil, the respective partial coils being situated parallel to each other and identically energized.

10. The sheet coil of claim 9, wherein, in each coil, the respective partial coils are electrically separated from each other on the insulative substrate.

11. The sheet coil of claim 9, wherein, in each coil, the respective partial  
5 coils are electrically connected to each other on the insulative substrate by one or more linking units.

12. The sheet coil of claim 9, wherein:  
each coil is defined by a respective wiring-trace pattern separated on the  
10 insulative substrate from adjacent wiring-trace patterns by a width ( $w_1$ ); and  
with respect to each coil, each partial coil being separated from adjacent  
partial coils of the coil by a width ( $w_2$ ), wherein  $w_2 < w_1$ .

13. The sheet coil of claim 9, wherein:  
15 each coil has a cyclic profile in the winding direction; and  
the substrate is pleat-folded along periodic fold lines extending perpendicular  
to the winding direction.

14. The sheet coil of claim 13, wherein:  
20 the cyclic profile has a period ( $\lambda$ ); and  
the fold lines are spaced from each other, in the winding direction, by  $\lambda/2$ .

15. The sheet coil of claim 14, wherein:  
the cyclic profile is trapezoidal, with mountains and valleys extending in  
25 opposite directions perpendicular to the winding direction; and  
respective fold lines are situated in each mountain and in each valley.

16. The sheet coil of claim 9, wherein the sheet coil comprises a number  
of coils that is an integer multiple of 3, so as to form at least one set of three coils.

17. The sheet coil of claim 16, wherein each coil in a set is energized by AC current having a different respective phase.

18. The sheet coil of claim 16, further comprising at least two sets of  
5 coils, each set including three respective coils, the coils of the sheet coil being divided into three groups of respective coils, each group including a coil from each set that is energized with a respective phase of 3-phase AC current for the respective group.

10 19. The sheet coil of claim 18, wherein, in each group, the partial coils of each constituent coil are connected in parallel with each other and the constituent coils are connected in series with each other.

20. The sheet coil of claim 18, wherein:  
15 in each group, the constituent coils are connected in series with each other;  
and

in each group, the partial coils are connected to each other such that a first partial coil of a first coil is connected in series to a second partial coil of a second coil, a second partial coil of the first coil is connected in series to a third partial coil of the second coil, and a third partial coil of the first coil is connected in series to a  
20 first partial coil of the second coil.

21. The sheet coil of claim 20, further comprising an integral connector unit formed on the insulative substrate, the connector unit comprising wiring traces  
25 for connecting respective pairs of partial coils together.

22. The sheet coil of claim 18, wherein:  
in each group, the constituent coils are connected in series with each other;  
and  
30 in each group, the partial coils are connected to each other such that a first partial coil of a first coil is connected in series to a third partial coil of a second coil,

a second partial coil of the first coil is connected in series to a second partial coil of the second coil, and a third partial coil of the first coil is connected in series to a first partial coil of the second coil.

5           23.     The sheet coil of claim 22, further comprising an integral connector unit formed on the insulative substrate, the connector unit comprising wiring traces for connecting respective pairs of partial coils together.

10           24.     The sheet coil of claim 9, comprising multiple sets of coils, wherein each set includes (m) coils ( $m \geq 2$ ), and each coil has (m - 1) slits that form (n) partial coils of the coil ( $n = m$ ).

15           25.     The sheet coil of claim 9, comprising multiple sets of coils, wherein each set includes (m) coils ( $m \geq 2$ ), and each coil has (k - 1) slits that form a number of partial coils equal to a divisor (k), including m, of the number (m) of coils.

20           26.     The sheet coil of claim 9, further comprising an integral connector unit formed on the insulative substrate, the connector unit being configured to connect selected partial coils together.

27.     A linear motor, comprising an armature including the sheet coil of claim 1.

25           28.     A stage unit, comprising the linear motor of claim 27.

29.     A lithographic exposure apparatus, comprising the stage unit of claim 28.

30           30.     A linear motor, comprising an armature including the sheet coil of claim 9.

31.     A stage unit, comprising the linear motor of claim 29.

32. A lithographic exposure apparatus, comprising the stage unit of claim 31.

33. A method for manufacturing a microelectronic device, comprising the  
5 steps:

- (a) preparing a substrate;
- (b) processing the substrate; and
- (c) assembling devices formed on the substrate during steps (a) and (b),

10 wherein step (b) comprises the steps of (i) applying a resist to the substrate; (ii) exposing the resist; and (iii) developing the resist; and step (ii) comprises providing a lithographic exposure apparatus as recited in claim 29; and using the lithographic exposure apparatus to expose the resist with the pattern defined on the reticle.

34. A method for manufacturing a microelectronic device, comprising the  
15 steps:

- (a) preparing a substrate;
- (b) processing the substrate; and
- (c) assembling devices formed on the substrate during steps (a) and (b),

20 wherein step (b) comprises the steps of (i) applying a resist to the substrate; (ii) exposing the resist; and (iii) developing the resist; and step (ii) comprises providing a lithographic exposure apparatus as recited in claim 32; and using the lithographic exposure apparatus to expose the resist with the pattern defined on the reticle.